

1. A method for responding to an input-output request from a host to effect a transfer to a specified location within a logical volume in a disk array storage device wherein a host operating system utilizes a first, uniquely identified, base unit control block corresponding to the logical volume to effect a transfer in response to the input-output request, said method enabling the host to send overlapped input-output request to the logical volume and comprising the steps of:

A) within the host

- i) defining at least one related, uniquely identified unit control block that identifies the logical volume,
- ii) interrupting the operating system response to the input-output request by assigning one of the base and related unit control blocks to the input-output request, and
- iii) returning control of the response to the input-output request to the operating system identifying

the assigned unit control block whereby the host operating system can issue overlapped input-output requests to the given logical volume, and

- B) within the disk array storage facility
 - i) establishing a table for the logical volume with an entry input-output requests and corresponding parameters, and
 - ii) testing the parameters for each new input-output request to the logical volume with respect to the parameters for input-output request entries in the table to determine which, of a plurality of control functions including enabling the processing of the input-output request by the storage facility, will be performed.

2. A method as recited in claim 1 wherein each control block includes an address range and said definition step in the host includes establishing a parallel access control block for each unit control block associated with the logical volume and establishing a parallel access main control block

for the logical volume through which each of the base and related unit control blocks can be identified.

3. A method as recited in claim 2 wherein each input-output request specifies an address range as a parameter, said parameter testing in the disk array storage device including the step of comparing the address range in the new input-output request with the address range of each input-output request in the table.
4. A method as recited in claim 3 wherein each input-output request includes other parameters and wherein said testing in the disk array storage device compares each of the other parameters of the new input-output request with the corresponding parameters of the input-output requests in the table.
5. A method as recited in claim 4 wherein a second parameter defines an input-output request that requires the entire

logical volume to be dedicated to that input-output request, said testing of the second parameter including:

- i) terminating the response to a first value of the second parameter in an existing input-output request in the table, and
- ii) placing the input-output request on the overlap polling queue in response to a first value of the second parameter in the new input-output request.

6. A method as recited in claim 5 wherein a third parameter has a first value that defines an input-output request to be processed without interruption, said testing of the third parameter in the disk array storage facility including:

- i) placing the new input-output request on the overlap polling queue if the third parameter for either the new or existing input-output request has the first value, and
- ii) enabling the comparison of the addresses in the input-output requests if neither of the new and

existing input-output requests has the first value of the third parameter.

7. A method as recited in claim 3 wherein said interruption step in the host includes:

- i) monitoring each input-output request from the host, and
- ii) diverting control to said assignment step when said input-output request is to the logical volume.

8. A method as recited in claim 7 wherein said assignment step in the host responds to each input-output request by:

- i) identifying a non-busy one of the base and related unit control blocks, and
- ii) assigning the input-output request to the non-busy one of the base and related unit control blocks.

9. A method as recited in claim 8 wherein said assignment step responds to each input-output request when all the base and related unit control blocks are busy by assigning the input-output request to the base and related unit control blocks in a predetermined order.
10. A method as recited in claim 8 wherein the disk array storage device causes an interrupt in the host upon completing a transfer and said step of diverting control establishes a parallel access mode of operation, said step of returning control responding to the receipt of the interruption by processing the request prior to returning control to the operating system.
11. A method as recited in claim 10 wherein said step of assigning a unit control block associated with a related unit control block includes substituting the address of that related unit control block for the base unit control block contained in the input-output request and wherein said interruption processing includes substituting the

address for the base unit control block in the input-output request.

12. A method as recited in claim 3 wherein each input-output request includes at least a first command with starting and ending addresses and wherein the host additionally optimizes input-output requests by:
 - i) intercepting the input-output request before a command transfers to the data storage facility,
 - ii) scanning each command in the input-output request for determining each starting and ending address,
 - iii) converting the scanned addresses into starting and ending addresses for an address extent that is coextensive with the collective command starting and ending addresses of the input-output request, and
 - iv) transferring the extent starting and ending addresses with the first command to the data storage facility.

13. A method as recited in claim 12 wherein said converting includes selecting the lowest starting address and the highest ending address of any command in the input-output request.
14. A method as recited in claim 13 wherein said converting includes:
 - i) initializing a starting address register and an ending address register, and
 - ii) replacing the contents of the starting and ending address registers when one of the starting and ending addresses of a command are less than and greater than the value in the corresponding one of the starting and ending address registers.
15. A method as recited in claim 14 additionally comprising the step of comparing the starting and ending address in the first command with the corresponding value in the starting and ending address registers.

16. A method as recited in claim 12 additionally comprising the step of replacing the write intent entry in the first command when the input-output request is devoid of any write commands.